SOCIAL INTERACTIONS AND SOCIO-ECONOMIC OUTCOMES: EVIDENCE FROM SAVINGS GROUP IN UGANDA

by

BIRAJ BISHT

A THESIS

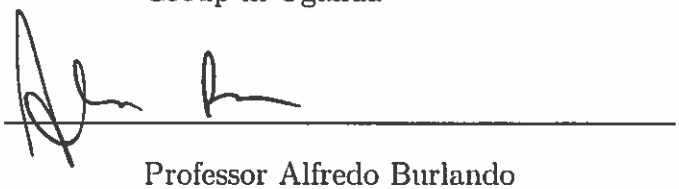
Presented to the Department of Economics
and the Clark Honors College of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Bachelor of Science

December 2014

An Abstract of the Thesis of

Biraj Bisht for the degree of Bachelor of Science
in the Department of Economics to be taken December 2014

Title: Social Interactions and Socio-economic Outcomes: Evidence from Savings Group in Uganda

Approved: 

Professor Alfredo Burlando

Abstract

Using data from a recent field experiment in Uganda, I use a fixed-effects model to estimate the effects of financial inclusion on the evolution of social interactions among its members. The results in my thesis indicate that social interactions increases among all members in a savings group, in particular there is a significant increase among non-vulnerable participants. The results also suggest strong presence of social benefits among some participants as a result of membership in informal savings and lending groups. Since higher social trust facilitates efficient economic exchanges, my findings suggest that informal savings groups have potential to build economically valuable social capital.

ACKNOWLEDGEMENTS

I thank Alfredo Burlando for continued support, feedback and mentorship throughout my thesis project and stay in Uganda. His impact on this thesis is immeasurable. In addition, I thank Mike Kuhn and Louise Bishop for their valuable input to this project. I thank my parents, my brother, and the Mortenson family their for continued love and support throughout my undergraduate education. Any remaining errors are my own.

TABLE OF CONTENTS

LIST OF FIGURES

Figure Page

LIST OF TABLES

Table Page

CHAPTER I

INTRODUCTION

> "In democratic countries the science of association is the mother of science; the progress of all the rest depends upon the progress it has made. Amongst the laws which rule human societies there is one which seems to be more precise and clear than all others. If men are to remain civilized, or to become so, the art of associating together must grow and improve in the same ratio in which the equality of conditions is increased."
>
> - Tocqueville, *Democracy In America* (1835)

The people with whom we choose to form relationships influence our behavior, beliefs, and decisions directly and indirectly. The effects of social interactions on most economic activities are well documented in economic literature and are particularly valuable in low-income economies where institutions for formal insurance and contract enforcement are weak. This suggests that programs facilitating regular interaction among its members might be an effective tool for development policy. In 1958, Edward C. Banfield wrote in *"The Moral Basis of Backward Society"* that social capital "is a very important limiting factor in the way of economic development in most of the world." Modern economic theory has, since then, evolved to account for the deadweight loss generated by the lack of social capital, or trust, during all contractual economic activities.

Recent research has focused on identifying factors that determine the formation and evolution of social interactions. A particular area of interest in economics is the study of informal financial groups in rural developing economies and its impact on the members and the society at large. But can simply encouraging people to join groups induce their overall social capital?

Using data from a recent savings groups field experiment in Uganda, I attempt to quantify the evolution of social interactions within the savings groups, with particular focus on the marginalized members of the community.

The experiment in Uganda is designed to evaluate the impact of including the most marginalized members of the community in Village Savings and Loan Associations (VSLAs). It is unusual for the most marginalized members to be part of the savings groups. The marginalized participants enrolled in these savings groups are also the most vulnerable by socio-economic measures. They have significantly lower income per capita, lower access to savings groups and formal bank accounts, higher failure rate of providing food to their families, and lower access to safe drinking water and latrine. Vulnerable and Non-vulnerable participants are clearly separated using a index created from the above measures. It is unclear why the vulnerable members usually do not join, but it seems they usually lack the connections and the resources to join the group. The rich members in the rural communities rarely join VSLAs because they have access to formal institutions such as banks and microfinance; hence, it is usually the case that the 'middle-income' forms the majority of the participants in VSLAs. However, the focus of this experiment is to include the most vulnerable members of the community.

VSLAs are non-market, self-managed, financial groups with increasing popularity in developing countries. A particular VSLA has about 20-30 members, living in close proximity, who meet on a weekly basis and are able to save and borrow in a structured way. Since members of the savings group borrow and lend from each other, trust and cooperation is crucial for the smooth functioning of these groups. According to a recent survey conducted by

VSL Associates, there are 6.12 million active participants worldwide, with 90% of its participants in Africa.[1] I provide detailed explanation of the experiment and how the VSLAs operate in chapter II.

There is a significant growth in economic literature that focuses on the provision of formal and informal financial services to poor households in developing economies. Rural developing economies constantly face an imbalance between the abundance of risk and a lack of resources to mitigate those risks. These risks come in form of illness, unfavorable weather, or a sudden need to finance an investment opportunity. Udry (1994) argued that stabilization of consumption in the face of fluctuating income is one of the primary reasons for the poor to borrow from formal and informal financial institutions. These institutions allow them to save for future needs, insure against erratic shocks, and invest in health, education, and income generating activities.

For my thesis, I use the partial VSLA data from a survey conducted for over 3000 respondents in rural Uganda. I combine the full data collected in 2013 to the partial data which is still under collection. This is a comprehensive data that captures the socio-economic status of the households throughout the study. A significant portion of this data set contains rich information about their social interactions and I create additional indices, which collectively capture a individual's social interaction. I use this data to explain the evolving social interactions within and among the savings groups.

My results suggest that involvement in savings groups has positive impact on social interactions for all participants and particularly significant increase is seen among non-vulnerable participants. Savings group membership yield

[1]Data retrieved November 6, 2014 from http://www.vsla.net/

higher social capital among participants who are relatively better-off. It is a widely held belief that higher social interactions contributes to trust and reciprocity, and consequently cooperation. These findings substantiate the claim that interaction in a group activity possibly yield economically valuable social capital. It allows policy makers and development agencies to consider important non-financial benefits of informal savings groups. As the current debate on financial inclusion for the poor evolves over time, the findings of this study will be valuable for resource allocations and design.

CHAPTER II

BACKGROUND

Background

In 2008, World Bank estimated that 2.47 billion people lived on less than two dollars per day. Among the 2.47 billion, the poorest 1.29 billion - 22% of the world's population - lives on less than $1.25 a day. [1] It is important to note that with such meagre incomes, access to financial tools become a crucial resource for livelihood. Note that earning $2 per day does not mean that their fixed salary is $2 per day. These individuals are usually self-employed and their incomes are highly erratic. With this budget in mind, a typical household head strives to ensure that they have sufficient food for their family, plan for unforeseen emergencies, save for big-ticket items such as furniture, education, funeral, and marriage. The ability to manage money well might not appear to be more important than being healthy or well educated, but it is fundamental to achieving these broader goals. Understanding these relationships has motivated development researchers to find financial innovations that work and to determine why they work in rural developing economies. Collins et al. (2010) argue in their recent book that "money management is, for the poor, a fundamental and well-understood part of everyday life." They are constantly looking for ways to make two dollars work in order to ensure there is enough food for dinner and also cover all other expenditures that life puts in their way.

[1] Data retrieved October 20, 2014 from http://go.worldbank.org/4K0EJIDFA0

Members of developed economies are equipped with sophisticated financial market institutions, such as commercial banks, credit unions, and insurance companies, which offer a myriad of services that allow them to live better lives. They make it easier for people to take out loans for education, real estate, innovative business ideas, health emergencies, etc. These market institutions fail in rural developing economies mostly because of information and enforcement problems. Without proper infrastructure, it is extremely difficult for these institutions to access enough informations such as credit history and equally little faith in the ability to seize collateral, resulting in frequent loan defaults. In addition, for formal institutions based in urban areas, the delivery costs for extending their services to the rural poor are extremely high.

As a consequence, informal savings groups, such as VSLAs, have served as a popular non-market institutions and has been rapidly growing in rural developing economies for the last two decades, primarily because of their sustainable nature. VSLA is a group-based, self-financed, savings group where members save and request loans from those savings. The purpose of a VSLA is to provide savings and loan facilities in areas that are not served by financial institutions. VSLAs have been introduced in 61 countries and have reached 6.12 million active participants worldwide. According to SAVIX, over 90% of the groups continue to operate more than five years after they received training.[2]

Each group is composed of 20-30 individuals and they hold weekly meetings to carry out their operations. At each meeting members can save by purchasing shares. The amount of each share is set by the group and all purchases are recorded in a logbook. The members can purchase up to five

[2]Data retrieved November 6, 2014 from http://savingsgroups.com/

shares at a particular meeting. The activity of the groups run in cycles of one year and the share price is set by the group at the beginning of the cycle. Participants independently decide how much they wish to contribute, and all the contributions are kept in a locked box. There is no minimum savings requirement. Each lock box has three padlocks and the keys are held by three members of the group. As the amount saved in the box grows over time, participants can request to borrow a portion of it, under condition that the loan is repaid with interest. Loans are for a maximum period of three months. At the end of a cycle, the total sum in the pot is redistributed back to the members, each obtaining a share that is proportional to the amount they deposited during the cycle; following the distribution, a new cycle starts.

As the new cycle begins, members who do not wish to continue may leave the group and new members may be invited. Members who continue on to the next cycle can use their shared-out amount to make contributions to the loan fund of the next cycle. Before the next cycle begins, members review the rules and make changes as they see necessary.

VSLAs provide both a source of interest-bearing savings and credit to the rural poor, a population that generally has access to neither. Generally, VSLAs are initiated by local Non-Governmental Organizations (NGOs): there are significant fixed costs that a group incurs, such as the stationary required to keep accounts and the large, metal box where the savings are kept, and often the group requires intensive training on the method. Once they are set up, VSLAs can be autonomously run solely by the members. Research shows positive benefits to financial inclusion through savings groups, as members build savings and are better equipped to improve the security of their household,

tackle unexpected shocks such as thefts, sickness, and death in the household. Traditional community methods of saving, such as the ROtating Savings and Credit Associations called ROSCAs, can provide an opportunity to save, but it does not allow them to earn interest on their deposits as a formal account would. Whereas, VSLAs allow group members to save and borrow while, at the same time, earn interest on their savings.

Literature Review

Literature in economics discussing financial services in developing countries is available in abundance. Townsend (1994) and Udry (1994) present evidence, from rural India and Nigeria respectively, that in the void of formal market institutions, non-market promote risk sharing in developing economies. Evidence suggests that, among developing countries, only about 7% of household borrowing occurs through formal institutions, majority of the transaction is between friends and relatives living in the same or adjacent villages (Fafchamps, 2003). Karlan et. al (2014) present evidence that only 22% of adults worldwide report saving at a formal financial institutions in the past 12 months, and approximately 77% adults living on less than $2 per day report not having a savings account at a formal institution. Karlan et. al (2009) argue that the possibility of losing valuable friendships secures informal transactions the same way that the possibility of losing physical collateral can secure formal lending. Since formal market institutions fail to perform perfectly, non-market institutions exist in large numbers around the world in developing economies. Non-market institutions harness the power of social ties to reduce information and enforcement problems.

Banerjee et. al. (2009) presented evidence that impact of financial inclusion was positive and significant, particularly among owners of pre-existing businesses and composition of household expenditure among urban poor in India. However the impact of inclusion was mostly limited to already-profitable businesses. There are numerous studies that provide evidence for the benefits of VSLAs to the poor. Ksoll et al. (2013) is one such study that demonstrates significant improvements in food security, increased savings, and other economic activities. Beaman et. al. (2013) suggest that participation in VSLAs improve food security and consumption variability in Mali. However, they find no evidence to suggest improvements in health or education.

There is also a growing evidence that suggests association between savings groups and social capital. Karlan, Ratan, and Zinman (2014), focusing on demand side constraints, argue that undersaving, which can lead to important welfare consequences, is mainly caused by constraints that include lack of trust and social constraints. They argue that undersaving can have important welfare consequences such as variable consumption, low resilience to shocks, and forgone profitable investments. The authors further argue that low social capital is a primary reason for low trust among the consumers of financial services. The lack of randomized field evaluations on the lack of trust is due to the difficulty in randomly assigning trust. In addition, Besley and Coate (1995) provides theoretical arguments for how micro finance can exploit social capital within communities to increase the viability of lending to the poor.

Membership in an informal savings group requires regular meetings for the members which has plausible influence on their social capital through their interactions. There is growing research on the impact of group involvement,

specifically among savings groups, on social capital. There exists a wide range of evidence that social capital contributes to the economic development, yet little is understood about how social capital is generated. An important reason for this is the endogenous nature of the social ties.

A body of literature also focuses on the interdependence between informal savings groups and social capital. For example, Comola and Silvia (2013) show that an exogenous intervention, an expansion in formal financial access, affects structure of the pre-existing network of informal financial transaction. In addition, they also propose a peer-effect estimation framework on household income. Kinnan and Townsend (2012) argue that, since the intra-village loan tends to be large and infrequent, consumption smoothing is higher if households have either, direct or indirect, financial network. Investment smoothing for larger amounts are higher if households have better kinship network in that particular village. Conley and Udry (2010) use unique communication patterns data in Ghana to estimate each individual's information neighborhood. They find evidence that farmers "adjust their inputs to align with those of their information neighbors who were surprisingly successful in previous periods". In addition to the importance of social capital in developing countries, Guiso et. al. (2004), exploiting the social capital differences in Italy, demonstrate that effect of social capital is strong where institutions for social contracts are weak.

The arguments made in this thesis are closest to a recent paper by Field et. al (2013), which uses experimental variation in group meeting frequency to show that meeting more frequently builds social capital among female micro finance clients in India. The authors are able to show that development programs that aim to cultivate social capital among women can have a strong

affect on the group cohesion well beyond the extent of the actual program. The authors construct a Social Contact Index to estimate the average effect size based on responses to the following four survey questions: (1) How many group members have you visited in their houses in the last two weeks?, (2) How many group members have visited you in your house in the last two weeks?, (3) How many people in the group did you talk to about business matters in the last two weeks?, and (4) How many people in the group did you talk to about personal matters in the last two weeks?.

In the following sections, I present evidence that inclusion in savings groups has positive and significant impact on group cohesion and social interactions particularly among the non-vulnerable members of the society.

CHAPTER III

EXPERIMENTAL DESIGN AND ESTIMATION

Project Overview

This research project is a collaboration between four NGOs based in Uganda: AVSI, CARE, TPO, and FHI 360. It is focused on providing financial services to the vulnerable households in rural Uganda.[1] The four NGOs collaborate on a much larger project, SCORE (Sustainable COmprehensive REsponses for vulnerable children and their families), which provides many services to 125,000 vulnerable children and their household in 35 districts across Uganda. Project SCORE was launched in fall of 2011 with a USD 9 million USAID grant. SCORE focuses their resources on improving the lives of the children and hence provides services in four main areas: economic strengthening, nutrition, child protection, and family strengthening.

SCORE is dedicated to provide interventions that build capacity in a sustainable manner among household rather than direct service delivery. Inclusion into the program required households to meet a vulnerability threshold which then allows members of the selected households to enroll in a number of programs, including classes on advanced farming techniques, cooking, nutrition, business training, business development, and an opportunity to participate in SCORE VSLAs. These VSLAs were formed by first enrolling project SCORE beneficiaries and then opening the membership to other

[1]Vulnerable participants have significantly lower income per capita, lower access to savings groups and formal bank accounts, higher failure rate of providing food to their families, and lower access to safe drinking water and latrine. Vulnerable and Non-vulnerable participants are clearly separated using a index created from the above measures.

community households. SCORE requires that at least 50% participants to be their beneficiaries. This rule makes SCORE VSLAs unique from other forms of informal savings groups in that there is a intentional effort to be inclusive of vulnerable and marginal households of rural areas.

Alfredo Burlando, Assistant Professor of Economics at University of Oregon, and Andrea Canidio, Assistant Professor of Economics at Central European University, are the Principal Investigators (PIs) of this project and their research seeks to evaluate the impact of randomly assigning varying composition of vulnerable participants in a SCORE VSLA. They work closely with all SCORE partners and primarily with FHI 360, a monitoring and evaluation agency, to conduct field activities. In January 2013, the PIs partnered with SCORE, as they were continuing their expansion in 90 previously unserved villages in Uganda. Among the SCORE vulnerable participants who showed interest in joining a VSLA, the PIs randomly chose 14 in each village to be part of the study. The PIs randomly assigned 60 villages to a dense treatment and remaining 30 villages to a sparse treatment. In each dense treatment village, the 14 pre-selected vulnerable participants were assigned to a VSLA along with 14 self-selected members from the same village, who were not required to meet the vulnerability threshold and were not part of SCORE. In each sparse treatment village, the 14 pre-selected vulnerable participants were divided into two VSLAs, each with 7 vulnerable participants and 21 self-selected members from the same village. In total, there were 120 VSLAs - 60 dense and 60 sparse - and each village was either sparse or dense to minimize spillover effects of the intervention. Figure 1 illustrates the difference in treatment between sparse and dense villages.

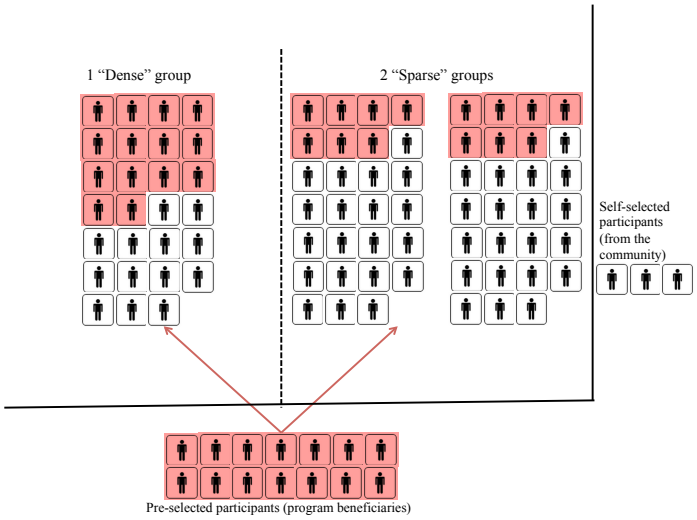


FIGURE 1. Treatment Figure

Identification of vulnerable participants was central to the exogenous intervention for this field experiment. In order to identify these participants, all households were asked questions that reflected their socio-economic status and well-being of the household and their children. Based on their responses, each respondent was assigned a vulnerability index. If a household scored above a threshold of 40, they were categorized as vulnerable and were eligible to participate in SCORE.

After the groups were formed, it was essential to check whether the experiment did what it was supposed to do. Following another wave of data collection, the results indicated that approximately 26% of the sparse groups and 52% of the dense groups were composed of vulnerable participants, as illustrated in Figure 2. For the rest of this paper, I will refer to the SCORE households that scored above the vulnerability threshold as direct beneficiaries and households from the community that self-selected into SCORE VSLAs as

indirect beneficiaries, as they are participating in a SCORE VSLA but are ineligible to receive other benefits.

FIGURE 2. Fraction of beneficiaries in the two VSLAs

Data

Administrative Data: SCORE field officers periodically collect administrative data which contains operational information about all the VSLAs. These include, but are not limited to, interest rate, amount saved by each member, minimum and maximum saving allowed by each group and length of the borrowing cycle etc.

Baseline and Endline: Baseline and Endline surveys are comprehensive surveys that captures detailed socio-economic characteristics of the household, income generating activities, consumption behavior, asset ownership, the individual's personal experience as a VSLA member, information on their social capital and informal lending and borrowing. Baseline surveys were administered few months following the formation of savings groups.

Social Capital Data: A section of baseline and endline surveys, given out to all the participants, focused on their social connections status. I use four social connection variables from the survey: participants were asked if they met someone in their group during free time, if the sought advice from someone in their group, if someone from their group sought advice from them, and if they were involved in other social groups. The data also captures the unique personal identification code of the people they interact with, however for the purposes of this paper I will use social capital variables as dummies. Dummy variables is used in econometrics to analyze qualitative data. In this case, dummy variables take the value 0 or 1 to indicate if their response was 'yes' or 'no' to a particular question. It is an artificial variable created to represent an attribute with two or more distinct categories. These dummy variables are used in regression analysis to capture the effect of their response on the outcome variable, or treat it as an outcome variable.

In order to better capture the change in social interactions, I create three different indices using the four social connections variables available in the data. The first was calculated using a z-score of the four variables, second index was a dummy which was 1 if the respondent answered 'yes' for at least one of the four questions, and the third index was created using the principal component analysis. Principal Component Analysis (pca) is a statistical method that gives us more information about the principal components and structure of the data. Refer to Tables 1, 2, and 3 for summary statistics of all the relevant variables that I use in this paper.

Estimation

I used fixed-effects estimation model to measure the impact of social interaction among beneficiaries.

Fixed effects model allows us to control for unobserved time-invariant heterogeneity among entities. In this case, the implementing partners (IPs) are different in how they conduct trainings when creating a certain VSLA. Each consortium partner - or the collaborating NGOs - work with local partners who implement the formation of VSLAs and regulate administrative data collection on the ground. These local implementing partners are equipped with varying resources and are working with VSLAs in different geographies. However, using a fixed-effects model we can still compare VSLAs formed by different IPs in a way that is not biased by omitted variables that account for these differences. The fixed-effects method controls for these entity level heterogeneities by leaving them out of the estimation.

I estimate the effects of vulnerability and group composition on social interaction using the following fixed-effects specification for IP j and clustered by parish:

$$SocialInteraction_i = \beta_1 Beneficiary_i + \sum_{j=1}^{23} \beta_{2j} \times \rho_{\{\rho=1 \text{ if } ip=j\}} + \varepsilon_i \quad (3.1)$$

$$SocialInteraction_i = \beta_1 Dense_i + \sum_{j=1}^{23} \beta_{2j} \times \rho_{\{\rho=1 \text{ if } ip=j\}} + \varepsilon_i \quad (3.2)$$

$$SocialInteraction_i = \beta_1 Beneficiary_i + \beta_2 Endline_i + \beta_3 (Beneficiary \times Endline)_i + \sum_{j=1}^{23} \beta_{4j} \times \rho_{\{\rho=1 \text{ if } ip=j\}} + \varepsilon_i \quad (3.3)$$

Estimation (3.3) specification uses panel estimates to look at vulnerable and non-vulnerable participants at endline. Panel estimates were constructed by setting-up each observation twice; at baseline and endline. Coefficient β_2 is of particular interest in estimation (3.3) as it estimates the coefficients for non-vulnerable participants at endline.

In all the regression tables, each coefficient estimate is accompanied by a robust standard error (clustered by parish); the number of observations in the estimation sample; and a goodness of fit measure (R^2). In addition, for all the regression tables where key coefficients are summarized, they include a implementing partner (IP) fixed effects. Therefore, all regression tables display abbreviated results, where fixed effects are suppressed. Note the number of observations vary for the social capital, social capital index regressions. This is due to the sub-sample data where I have access to only 1,484 observations.

Results

The results I present in the body of this thesis are from two data sets: first was collected in 2013 between August and November and the second comes from the subsample of the collection that began in August 2014, and is still in process, which is matched with the first dataset.

Vulnerability

In Tables 4, 5, and 6, differences between the direct and indirect beneficiaries are displayed using the economic and livelihood status indicators: income per capita in Ugandan Shillings (UGX), land owned in acres, access to savings account, involvement in other savings groups, currently have a bank loan, disability rates at home, household size, failure to provide food, access to safe drinking water, and access to latrine. These indicators were selected by the PIs and together these metrics are used to determine the vulnerability index of the beneficiaries.

Note that all regressions are accompanied by robust standard errors and fixed effects for implementing partners (IPs).

Table 6 estimates the regression coefficients for the economic and livelihood status among direct and indirect beneficiaries. The most clear results in Table 6 are for income per capita, involvement in other savings groups, currently have a bank loan, failure to provide food at the end of the day, and access to safe drinking water and latrine. The coefficient estimates associated with these events are significantly different from zero. The results indicate that beneficiaries are approximately 25.5% less likely to be a part of another savings group, 3.26% less likely to have a bank loan, 19.5 % more likely to go without food, 7.7 % more likely to have access to safe drinking water, 11.7% less likely to have access to latrine, and on average beneficiaries' income per capita is 2,230 less than indirect beneficiaries in Ugandan Shillings. From the above indicators, it is clear that, initially, direct and indirect beneficiaries are significantly different in most metrics of vulnerability.

Similarly, Tables 7 and 9 are regression tables where the same fixed effects and robust standard errors follow. These regression estimate the coefficients for social capital indicators and the specified social capital indices, respectively, using the subsample from endline. The most unambiguous results in Table 7 are for visitation during free time, seeking advice, giving advice, and involvement in social groups; all coefficient estimates are significantly different from zero at baseline and endline, except for social groups, which is only significant at baseline. The results indicate that, at baseline, the beneficiaries are 19.1% more likely to meet someone during their free time, 25.7% more likely to seek advice from someone, 21.4% more likely to give advice to someone, 2.9% less likely to be involved in other social groups. At endline, the beneficiaries are 7.3% less likely to meet someone during their free time, 5.5% less likely to seek advice, and 5.6% less likely to give advice to someone. Note that most endline coefficient estimates are weakly significant and negative. However, there is a significant change in the variable "other social groups", which indicates that, relative to non-beneficiaries, beneficiaries are 10.2% more likely to be involved in other social groups.

The results in Table 9 are additional metrics that were created to collectively measure social capital and cohesion between direct and indirect beneficiaries. I estimated coefficients for three different social indices at baseline and endline and the results in Table 9 indicate that all but z score index at endline are significantly different from zero. The results imply that, at baseline, beneficiaries are 0.427 standard deviations higher than non-beneficiaries, 4.6 % more likely to answer yes for at least one of the social capital questions in Table 7, and have 0.783 higher principal component analysis (pca) index. At

endline, beneficiaries are 4.6 % less likely to answer yes for at least one of the social capital questions in Table 7 and they have 0.237 lower pca index. The results from Table 7 and 9 indicate that beneficiaries are initially more likely to have significantly higher social connections within the group, however the difference is less significant at endline. A plausible reason might be that indirect beneficiaries have much higher social connections at endline. Note in Table 9, both, z score and pca social indices are less significant than their corresponding measures at baseline.

The results in Tables 10 and 11 further investigate the differences between direct and indirect beneficiaries. In addition to IP fixed effects and robust standard errors, Table 10 also includes a dummy interaction between the variables *endline* and *beneficiary*. Note that coefficient estimates for the variable endline is the average change for indirect beneficiaries at endline. At endline, indirect beneficiaries are 31.2 % more likely to visit someone during their free time, 48.8% more likely to seek advice and 40.9% more likely to give advice to someone. However, beneficiaries are 11.4% more likely to be involved in other social groups at endline. At endline, indirect beneficiaries are 0.883 standard deviations higher in z-score index, 1.427 points higher according to pica index, and 2.3% more likely to answer yes to at least one of four social connection questions, all results are significantly different from zero.

Most results remain similar and significant in Table 11 where individual fixed effects are included, instead of IP fixed effects. According to Table 11, at endline, indirect beneficiaries are 31.2 % more likely to visit someone during their free time, 48.8% more likely to seek advice and 40.9% more likely to give advice to someone. Beneficiaries are still 11.4% more likely to be a part of

other social groups. At endline, indirect beneficiaries also score 0.883 standard deviations higher in z-score index, 23.1% more likely to answer yes to at least one of four questions, and have 1.427 points higher pca index.

Dense

In Table 14, differences between the dense and sparse VSLAs are displayed using the same economic and livelihood indicators used above. Note that dense VSLAs have, on average, 50 % higher composition of vulnerable participants than sparse VSLAs. Table 14 estimates the regression coefficients for the economic and livelihood status among dense and sparse VSLAs. Among the dense and sparse groups, the most clear results are for acres of land owned, failure to provide food, and access to safe water. Participants in the dense VSLAs are likely to own 59.2 % more land, 6.9% more likely to go without food, and have 13 % more likely to have access to safe drinking water. Other estimates are not significantly different from zero. From the results, it seems that dense and sparse VSLAs look alike. Note that participants in the dense VSLA are more likely to go without food, but other variables are similar.

The results in Tables 12 and 13 are regression tables that estimate the coefficients for social capital indicators and the specified social capital indices, respectively, using the subsample from endline. Among all variables for social capital and social capital index, involvement in other social groups - at endline - is the only variable that is significantly different from zero. The overall social capital measures seem very alike between dense and sparse groups.

CHAPTER IV

CAVEATS AND CONCLUSIONS

Caveats and Future Research

The results of my study could improve if I had access to the entire endline data. The activities are currently ongoing and are anticipated to be available towards the end of this year. I have used approximately half of the endline data for my thesis purposes and with the entire data, some results could change.

With more time, I would have manipulated the available data to include the individual characteristics of each person in the network and document the pattern of social connections. This way one could easily see if social capital is being created across socio-economic characteristics. I would also be interested to document changes in the financial behavior as a result of their social networks. Perhaps these data would allow me to make further inferences about the evolution of social network quality and its impact on socio-economic and financial outcomes.

Conclusions

This thesis applies econometric methods to estimate the evolution of social networks among individuals of varying socio-economic backgrounds participating in Village Savings and Loan Associations (VSLAs). It provides empirical support to the idea that group involvement creates economically valuable social capital. The fundamental results of my research suggest that, at least initially, vulnerable participants have higher social capital compared to

their counterparts. However, over time, change in social capital is much higher for non-vulnerable participants. These results support the hypothesis that group activities positively contribute to social interactions, and consequently to efficient economic transactions.

It is important to note that overall change among vulnerable participants is low. This might be due to their initial low socio-economic status which potentially prevented them from creating new networks with non-vulnerable participants. Relative to the vulnerable participants, social capital is low among non-vulnerable participants at baseline, and significant increase at endline suggests that they are interacting within the group at a much higher rate. Note that non-vulnerable participants are significantly different, socio-economically, from vulnerable participants and they self-selected themselves into these savings groups. These factors might be an indication that non-vulnerable participants are inherently more sociable than the vulnerable participants.

Another interesting finding is that, over time, involvement in other social groups, among vulnerable participants, increases drastically. This could be an indication that vulnerable participants are developing social skills during their VSLA membership. This provides evidence that development programs that are designed to facilitate repeated interactions among its members can enhance social capital, sociability, and therefore meaningful economic interactions.

The key results of my analysis align with previous results in the literature [e.g. Fields et. al. (2013) and Comola and Silvia (2013)]. These authors suggest that meeting frequency and financial inclusion, respectively, affect social interactions among its members.

The evidence from my paper demonstrates that VSLA activities affect social networks among some groups considerably, which imply that group-based activities may have a substantial impact on social networks. To the extent that VSLA activities might be important tools of further risk-sharing, cooperation and information diffusion. An important objective of future research would be to understand how development programs and policies can be designed to improve the social infrastructure of poor communities.

Tables

TABLE 1. Summary statistics: full sample at baseline($N = 3,899$)

Variable	Mean	Std. Dev.	t-stat
Number of Neighbors	1.37	2.7	5.09
Number of Relatives	2.236	2.39	2.17
Visit during free time	0.457	0.498	-12.96
Seek Advice	0.338	0.473	-14.31
Give Advice	0.302	0.459	-10.68
Social Groups	0.347	0.476	5.87
Social Index z-score	0.003	1.005	-11.00
Social Index at least 1	0.624	0.484	-5.37

TABLE 2. Summary statistics: sub sample at endline ($N = 1,484$)

	Baseline			Endline		
Variable	Mean	Std. Dev.	t-stat	Mean	Std. Dev.	t-stat
Number of Neighbors	2.3	2.17	6.67	2.3	2.08	-3.71
Number of Relatives	1.31	2.65	2.39	1.51	2.6	-0.09
Visit during free time	0.57	0.495	-7.64	0.78	0.41	3.74
Seek Advice	0.42	0.494	-10.13	0.79	0.41	2.54
Give Advice	0.396	0.489	-8.81	0.70	0.46	2.42
Social Groups	0.482	0.50	6.77	0.53	0.49	2.45
Social Index z-score	0.0002	1	-1.42	0.008	0.99	-2.4
Social Index at least 1	0.813	0.39	0	0.93	0.25	0
Social Index pca	$4e^{-09}$	1.45	-1.67	$-1.6e^{-08}$	1.46	-3.2
t-statistic: differences among beneficiaries						

TABLE 3. Summary statistics: Combined Indices ($N = 2,462$)

	Baseline			Endline		
Variable	Mean	Std. Dev.	t-stat	Mean	Std. Dev.	t-stat
Social Index z-score	-0.374	0.966	4.03	0.369	0.891	-4.88
Social Index at least 1	0.799	0.4	3.39	0.935	0.25	0.72
Social Index pca	-0.584	1.45	3.8	0.584	1.26	-7.22
t-statistic: differences among beneficiaries						

TABLE 4. Direct and Indirect beneficiaries: Economic indicators

Characteristic	Direct	Indirect	Difference	Significance
Income per capital (UGX)	8540	11,051	2,300 UGX lower	Yes
Land owned (acres)	2.54	1.86	0.54 higher	Yes
Has savings account	6.0%	9.5%	3.3% lower	Yes
Other savings groups	18.5%	24.6%	4.6% lower	Yes
Had a bank loan	2.8%	4.6%	1.8% lower	Yes

TABLE 5. Direct and Indirect beneficiaries: Livelihood status indicators

Characteristic	Direct	Indirect	Difference	Significance
Disability rates at home	40%	29%	9.3% higher	Yes
Household size	6.4	6.5	0.1 higher	No
Sometimes goes without food	69.2%	49.4%	19.4 % higher	Yes
Access to safe water	67.7%	61.8%	7.8 % higher	Yes
Access to latrine	77.3%	90%	11.7% higher	Yes

TABLE 6. Direct and Indirect beneficiaries: Economic and Livelihood indicators

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	income per capita (UGX)	Land Owned (acres)	Access to bank account	Member in other savings group	Had Bank Loan	Disability in the household	Failure to provide food	Access to safe water	Access to latrine
beneficiary	-2,230**	0.677	-0.0326*	-0.255***	-0.0178*	-0.0937***	0.195***	0.0777*	-0.117***
	(952.1)	(0.363)	(0.0182)	(0.0634)	(0.00991)	(0.0599)	(0.0435)	(0.0450)	(0.0258)
Constant	10,168**	4.647**	-0.0342	0.220**	0.00737**	0.601**	0.367**	0.608**	0.856**
	(503.0)	(0.124)	(0.0490)	(0.0217)	(0.00339)	(0.00444)	(0.0230)	(0.0193)	(0.0136)
Observations	2,995	2,338	2,338	2,338	2,338	1,604	2,962	2,630	3,037
R-squared	0.093	0.139	0.018	0.334	0.067	0.155	0.204	0.333	0.122

Robust standard errors in parentheses and IP fixed effects for all variables
(*** p<0.01, ** p<0.05, * p<0.1)

TABLE 7. Direct and Indirect beneficiaries: social capital using subsample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Baseline				Endline			
Variables	free time visits	seek advice	give advice	other social groups	free time visits	seek advice	give advice	other social groups
beneficiary	0.191***	0.257***	0.214***	-0.029*	-0.073*	-0.055*	-0.056**	0.102**
	(0.034)	(0.039)	(0.038)	(0.043)	(0.038)	(0.043)	(0.026)	(0.040)
control	0.505	0.3337	0.3173	0.5439	0.807	0.812	0.721	0.554
Observations	1,484	1,484	1,484	1,484	1,484	1,484	1,484	1,484
R-squared	0.359	0.227	0.203	0.181	0.121	0.170	0.227	0.335

Robust standard errors in parentheses and IP fixed effects for all variables
(*** p<0.01, ** p<0.05, * p<0.1)

TABLE 8. Direct and Indirect beneficiaries: social capital without fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Baseline				Endline			
Variables	free time visits	seek advice	give advice	other social groups	free time visits	seek advice	give advice	other social groups
beneficiary	0.203*	0.265**	0.230**	-0.105*	-0.085*	-0.056*	-0.0607**	0.013*
	(0.054)	(0.048)	(0.049)	(0.512)	(0.043)	(0.037)	(0.043)	(0.061)
control	0.505	0.3337	0.3173	0.5439	0.807	0.812	0.721	0.554
Observations	1,484	1,484	1,484	1,484	1,484	1,484	1,484	1,484
R-squared	0.359	0.227	0.203	0.181	0.121	0.170	0.227	0.335

Robust standard errors in parentheses
(*** p<0.01, ** p<0.05, * p<0.1)

TABLE 9. Direct and Indirect beneficiaries: Social Index

	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline			Endline		
VARIABLES	z-Index	at least one	pca Index	z-Index	at least one	pca Index
beneficiary	0.427***	-0.0458**	0.783***	0.0989	0.0458*	-0.237**
	(0.0703)	(0.0264)	(0.105)	(0.0738)	(0.0205)	(0.101)
Constant	-0.373***	0.0179	0.739***	1.017***	-0.900***	0.296***
	(0.0266)	(0.0279)	(0.00998)	(0.00776)	(0.0395)	(0.0382)
Observations	1,484	1,484	1,484	1,484	1,484	1,484
R-squared	0.236	0.242	0.165	0.120	0.269	0.241

Robust standard errors in parentheses and IP fixed effects for all variables
(*** p<0.01, ** p<0.05, * p<0.1)

TABLE 10. Indirect beneficiaries and social capital: Interactive dummies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	free time visits	seek advice	give advice	other social groups	z index	at least one index	pca index
beneficiary	0.187***	0.230***	0.208***	-0.099**	0.435***	0.0680**	0.732***
	(0.0398)	(0.0389)	(0.0449)	(0.484)	(0.0790)	(0.0475)	(0.001)
endline	0.312***	0.488***	0.409***	0.0088*	0.883***	0.231***	1.427***
	(0.0441)	(0.0457)	(0.0513)	(0.061)	(0.0965)	(0.0253)	(0.156)
ben×end	-0.272***	-0.294***	-0.283***	0.114**	-0.533***	-0.0933**	-0.939***
	(0.0547)	(0.0540)	(0.0581)	(0.015)	(0.126)	(0.037)	(0.001)
Observations	2,462	2,462	2,462	2,462	2,462	2,462	2,462
R-squared	0.143	0.237	0.196	0.351	0.263	0.122	0.242

Robust standard errors in parentheses and IP fixed effects for all variables
(*** p<0.01, ** p<0.05, * p<0.1)

TABLE 11. Indirect beneficiaries and social capital: Interactive dummies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	free time visits	seek advice	give advice	other social groups	z index	at least one index	pca index
endline	0.312***	0.488***	0.409***	0.0088	0.883	0.231***	1.427***
	(0.0621)	(0.0644)	(0.0723)	(0.00685)	(0.136)	(0.0357)	(0.219)
ben×end	-0.272***	-0.294***	-0.283***	0.114*	-0.533***	-0.0349	-0.980***
	(0.0771)	(0.0761)	(0.0819)	(0.079)	(0.177)	(0.0571)	(0.250)
Observations	2,462	2,462	2,462	2,462	2,462	2,462	2,462
R-squared	0.564	0.600	0.573	0.889	0.645	0.584	0.601

Robust standard errors in parentheses and Individual fixed effects for all variables
(*** p<0.01, ** p<0.05, * p<0.1)

TABLE 12. Dense and Sparse VSLAs: social capital using subsample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Baseline				Endline			
Variables	free time visits	seek advice	give advice	other social groups	free time visits	seek advice	give advice	other social groups
dense	0.00353	0.0829	-0.0362	0.0348	-0.0304	-0.0384	0.00469	0.0500*
	(0.0539)	(0.0511)	(0.0679)	(0.0413)	(0.0342)	(0.0369)	(0.0456)	(0.0284)
avg in control group	0.321	0.213	0.388	0.668	0.652	0.611	0.533	0.564
Observations	1,484	1,484	1,484	1,484	1,484	1,484	1,484	1,484
R-squared	0.197	0.153	0.144	0.353	0.116	0.167	0.224	0.336

Robust standard errors in parentheses and IP fixed effects for all variables
(*** p<0.01, ** p<0.05, * p<0.1)

TABLE 13. Dense and Spare VSLAs: Social Capital Index

	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline			Endline		
VARIABLES	z-Index	at least one	pca Index	z-Index	at least one	pca Index
dense	0.0642	-0.000867	0.0573	0.0186	0.0208	-0.0710
	(0.120)	(0.0670)	(0.0231)	(0.0201)	(0.180)	(0.120)
avg in control group	0.276	0.367	0.458	0.579	0.662	0.577
Observations	1,484	1,484	1,484	1,484	1,484	1,484
R-squared	0.200	0.240	0.162	0.115	0.212	0.236

Robust standard errors in parentheses and IP fixed effects for all variables
(*** p<0.01, ** p<0.05, * p<0.1)

TABLE 14. Dense and Sparse VSLAs: Economic and Livelihood indicators

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	income per capita (UGX)	Land Owned (acres)	Access to bank account	Member in other savings group	Had Bank Loan	Disability in the household	Failure to provide food	Access to safe water	Access to latrine
dense	-1,587	0.535***	-0.0669	0.0297	-0.00827	0.0200	0.0806**	0.124**	-0.0339
	(971.5)	(0.183)	(0.0570)	(0.0531)	(0.0101)	(0.0351)	(0.0386)	(0.0612)	(0.0216)
Constant	10,577***	4.294***	0.0669	0.102*	0.00827	0.573***	0.391***	0.512***	0.826***
	(971.5)	(0.183)	(0.0570)	(0.0531)	(0.0101)	(0.0351)	(0.0386)	(0.0612)	(0.0216)
Observations	3,008	2,351	2,351	2,351	2,351	1,615	2,975	2,642	3,050
R-squared	0.092	0.130	0.018	0.315	0.065	0.154	0.169	0.341	0.096

Robust standard errors in parentheses and IP fixed effects for all variables
(*** p<0.01, ** p<0.05, * p<0.1)

APPENDIX

ECONOMETRIC METHOD: FIXED EFFECTS

A detailed and rigorous discussion of econometrics is beyond the scope of this thesis, however this appendix discusses the intuition behind why the fixed-effects model are used in this research.

Fixed effects model allows us to control for unobserved time-invariant heterogeneity among entities. In this case, the implementing partners (IPs) are different in how they conduct trainings when creating a certain VSLA. Each consortium partner - or the collaborating NGOs - work with local partners who implement the formation of VSLAs and regulate administrative data collection on the ground. These local implementing partners are equipped with varying resources and are working with VSLAs in different geographies. However, using a fixed-effects model we can still compare VSLAs formed by different IPs in a way that is not biased by omitted variables that account for these differences. The fixed-effects method controls for these entity level heterogeneities by leaving them out of the estimation. The mathematical interpretation follows:

$$Y_i = \beta_1 X_i + \beta_2 \sum_{j=1}^{23} d \times i_{\{\ i=1 \text{ if } ip=j\}} \ + \varepsilon_i$$

References

1. Banerjee et. al (2014). "Miracle of Microfinance? Evidence from a randomized evaluation". forthcoming, American Economic Journal: Applied Economics.

2. Besley, T. and S. Coate (1995). "Group Lending, Repayment Incentives and Social Col- lateral". Journal of Development Economics 46 (1), 1?18.

3. Comola, M. and Silvia, P (2014). "Do Interventions Change the Network? A Dynamic Peer Effect Model Accounting for Network Changes". Working Paper.

4. Collins, Daryl, Morduch, Rutherford, and Ruthven. (2009). "Portfolios of the Poor: How the World?s Poor Live on $2 a Day". Princeton, NJ: Princeton University Press.

5. Conley, T and Udry, C. (2010). "Learning about a New Technology: Pineapples in Ghana". American Economic Review, 100(1).

6. Field et. al. (2014). "Do Group Dynamics Influence Social Capital and Female Empowerment? Experimental Evidence from Microfinance" Journal of Policy Analysis and Management. 33(4): 932-949.

7. Guiso et. al (2004). "The Role of Social Capital in Financial Development". American Economic Review. 94(3), 526?556.

8. Karlan, D. and Markus Mobius, Tanya Rosenblat, and Adam Szeidl. (2009). "Trust and Social Collateral." The Quarterly Journal of Economics, 124(3): 1307-1361.

9. Karlan, Ratan, and Zinman. (2014). "Savings by and for the Poor: A research review and agenda". Review of Income and Wealth. 60(1):12101

10. Kinnan, Cynthia, and Robert M. Townsend. (2012). "Kinship and Financial Net- works, Formal Financial Access and Risk Reduction." American Economic Review, Papers and Proceedings, 102(3): 289-93.

11. Ksoll et. al. (2013). "Impact of Village Savings and Loans Associations: Evidence from a cluster randomized trial"

12. Townsend, Robert M. (1994). "Risk and Insurance in Village India." Econometrica, 62(3): 539-591.

13. Udry, Christopher (1994). Risk and Insurance in a Rural Credit Market: An Empirical Investigation in Northern Nigeria. Review of Economic Studies, 61, 495-526